

**IN THE CLAIMS:**

This listing of claims will replace all prior versions, and listings of claims in the application. Claims 1-55 are presented as follows.

1. (Currently Amended). An apparatus for autonomous operation over an area comprising:

a drive system; and,

a controller in communication with said drive system, said controller including a processor programmed to:

provide at least one scanning pattern for a first portion of said area;

analyze said first portion for an opening to a second portion of said area; and,

signal said drive system to move along a path at least proximate the periphery of said first portion to and through said opening to said second portion of said area.

2. (Original). The apparatus of claim 1, wherein said processor is additionally programmed to provide at least one scanning pattern for said second portion of said area.

3. (Original). The apparatus of claim 1, wherein said processor is additionally programmed to indicate the end of said at least one scanning pattern for said first portion of said area when lateral advancement of said apparatus in accordance with said at least one scanning pattern is no longer possible.

4. (Original). The apparatus of claim 1, wherein said at least one scanning pattern provided is substantially free of repetition.
5. (Original). The apparatus of claim 2, wherein said at least one scanning pattern provided is substantially free of repetition.
6. (Original). The apparatus of claim 1, wherein said movement at least proximate to said periphery of said first portion includes a contour movement.
7. (Currently Amended). An apparatus for autonomous operation over an area comprising:
- a drive system; and,
  - a controller in communication with said drive system, said controller including a processor programmed to:
    - provide at least one scanning pattern for a portion of said area from a first point;
    - signal said drive system to move along a path at least proximate the periphery of the scanned portion to a second point, said second point at a different location than said first point; and,
    - provide at least one scanning pattern for a portion of said area from said second point.
8. (Original). The apparatus of claim 7, wherein said processor is programmed such that said path includes a predetermined length.

9. (Original). The apparatus of claim 7, wherein said processor is additionally programmed to dynamically determine the length of said path.

10. (Currently Amended). The apparatus of claim 9, wherein said length of said path (D) determined dynamically is in accordance with the formula:

$$D = [K_1 \cdot d] [\Sigma L_i / \max \{ L_i \}] + [K_2 \cdot \max \{ L_i \}]$$

where,

$L_i$  is the series  $L_1$  to  $L_n$ , and  $L_1$  to  $L_n$  are the lengths of each straight line portion of the scanned pattern;

$K_1$  and  $K_2$  are such that  $K_1 = 0.8$ ,  $K_2 = 1$ , where  $L_i$  are measured in meters; and,

$d$  is the diameter of the apparatus expressed in meters.

11. – 15. (Cancelled)

16. (Currently Amended). A method for coverage of an area by an autonomous machine comprising:

scanning a first portion of said area in accordance with at least one scanning pattern;

analyzing said first portion for an opening to a second portion of said area; and,

moving along a path at least proximate to the periphery of said first portion to and through said opening to said second portion of said area.

17. (Original). The method of claim 16, additionally comprising: scanning said second portion in accordance with at least one scanning pattern.

18. (Original). The method of claim 16, additionally comprising: indicating the end of said at least one scanning pattern for said first portion of said area when lateral advancement of said apparatus in accordance with said at least one scanning pattern is no longer possible.

19. (Original). The method of claim 16, wherein said at least one scanning pattern is executed substantially free of repetition.

20. (Original). The method of claim 17, wherein said at least one scanning pattern is executed substantially free of repetition.

21. (Original). The method of claim 16, wherein said movement at least proximate to said periphery of said first portion includes a contour movement.

22. (Currently Amended). A method for coverage of an area by an autonomous machine comprising:

scanning a portion of said area in accordance with at least one scanning pattern,  
from a first point;

moving along a path at least proximate the periphery of said scanned portion to a second point, said second point at a different location than said first point; and,  
scanning a portion of said area in accordance with at least one scanning pattern, from said second point.

23. (Original). The method of claim 22, wherein said moving along said path includes moving a predetermined length.

24. (Original). The method of claim 22, wherein said moving along said path includes determining the length of said path dynamically.

25. (Currently Amended). The method of claim 22, wherein said determining the length of said path (D) dynamically is in accordance with the formula:

$$D = [K_1 \cdot d] [\sum L_i / \max \{ L_i \}] + [K_2 \cdot \max \{ L_i \}]$$

where,

$L_i$  is the series  $L_1$  to  $L_n$ , and  $L_1$  to  $L_n$  are the lengths of each straight line portion of the scanned pattern;

$K_1$  and  $K_2$  are such that  $K_1 = 0.8$ ,  $K_2 = 1$ , where  $L_i$  are measured in meters; and,

$d$  is the diameter of the apparatus expressed in meters.

26. – 35. (Cancelled).

36. (Previously Presented). The apparatus of claim 1, additionally comprising: a vacuum cleaning system in operative communication with said controller.

37. (Previously Presented). The apparatus of claim 7, additionally comprising: a vacuum cleaning system in operative communication with said controller.

38. (Previously Presented). The method of claim 17, additionally comprising: vacuum cleaning during at least a portion of said scanning said first portion of said area, and during at least a portion of said scanning said second portion of said area.

39. (Previously Presented). The method of claim 16, wherein said area includes at least one room.

40. (Previously Presented). The method of claim 16, wherein said area includes a plurality of rooms.

41. (Previously Presented). The method of claim 22, additionally comprising: vacuum cleaning during at least a portion of said scanning.

42. (Previously Presented). The method of claim 22, wherein said area includes at least one room.

43. (Previously Presented). The method of claim 22, wherein said area includes a plurality of rooms.

44. (New). An apparatus for autonomous operation over an area comprising:

a drive system; and,

a controller in communication with said drive system, said controller including a processor programmed to:

provide at least one scanning pattern for a first portion of said area, said scanning pattern substantially free of repetition;

analyze said first portion for an opening to a second portion of said area; and,

signal said drive system to move along a path at least proximate the periphery of said first portion to and through said opening to said second portion of said area.

45. (New). The apparatus of claim 44, wherein said processor is additionally programmed to provide at least one scanning pattern for said second portion of said area.

46. (New). The apparatus of claim 44, wherein said processor is additionally programmed to indicate the end of said at least one scanning pattern for said first portion of said area when lateral advancement of said apparatus in accordance with said at least one scanning pattern is no longer possible.

47. (New). The apparatus of claim 44, wherein said movement at least proximate to said periphery of said first portion includes a contour movement.

48. (New). The apparatus of claim 44, additionally comprising: a vacuum cleaning system in operative communication with said controller.

49. (New). A method for coverage of an area by an autonomous machine comprising:

scanning a first portion of said area in accordance with at least one scanning pattern, said at least one scanning pattern substantially free of repetition;

analyzing said first portion for an opening to a second portion of said area; and,

moving along a path at least proximate to the periphery of said first portion to and through said opening to said second portion of said area.

50. (New). The method of claim 49, additionally comprising: scanning said second portion in accordance with at least one scanning pattern.

51. (New). The method of claim 49, additionally comprising: indicating the end of said at least one scanning pattern for said first portion of said area when lateral advancement of said apparatus in accordance with said at least one scanning pattern is no longer possible.

52. (New). The method of claim 49, wherein said movement at least proximate to said periphery of said first portion includes a contour movement.



53. (New). The method of claim 50, additionally comprising: vacuum cleaning during at least a portion of said scanning said first portion of said area, and during at least a portion of said scanning said second portion of said area.

54. (New). The method of claim 50, wherein said area includes at least one room.

55. (New). The method of claim 50, wherein said area includes a plurality of rooms.